a cutting assembly (7) spaced apart from the pair of rollers, the cutting assembly having a cutting width;

a second motor (9) driving the cutting assembly to cut;

a third motor (5) pivoting one of the cutting assembly and the pair of rollers from time to time to align said cutting assembly (7) and one of said boundary marks (M);

a reading system having first and second spaced apart optical sensors (4, 4') that detect one of the boundary marks (M) between the images, the second optical sensor spaced from the first optical sensor a distance equal to a fraction of the cutting width; and

a microprocessor (12) in communication with said reading system and the second motor (9) and the third motor (5), the microprocessor having stored therein a stored intensity and a stored size respectively corresponding to the size and intensity of each of the white and black lines, the microprocessor (12) configured (i) to recognize the boundary marks (M) based on a detection of the boundary mark by both the first and second optical sensors and a comparison between the stored intensity and a detected intensity of each of the white and black lines, and (ii) to control the second and third motors (9, 5) based on recognition of the boundary marks (M).

Proposed Amendment to Claim 1 - Marked-up Version

1. (Five Times Amended) An automatic device for trimming and cutting at right angles paper and other graphic and photographic substrates (1) with a series of images (10) printed thereon and marked by boundary marks (M) [having a feature] comprising a preset sequence of white and black lines extending [at least along a whole edge] along an edge of each of said images (10) oriented at right angles to a feed direction of the substrate, each of the white and black lines having a size and an intensity, the automatic device comprising:

at least a pair of rollers (2) for feeding the substrate;

a first motor (3) driving the pair of rollers;

a cutting assembly (7) spaced apart from the pair of rollers, the cutting assembly having a cutting width;

a second motor (9) driving the cutting assembly to cut;

a third motor (5) pivoting one of the cutting assembly and the pair of rollers from time to time to align said cutting assembly (7) and one of said boundary marks (M);

a reading system having first and second spaced apart optical sensors (4, 4') that detect one of the boundary marks (M) between the images, the second optical sensor spaced from the first optical sensor a distance equal to a fraction of the cutting width; and

a microprocessor (12) in communication with said reading system and the second motor (9) and the third motor (5), the microprocessor having stored therein [a preset sequence of marks corresponding to the feature of the boundary marks (M)] a stored intensity and a stored size respectively corresponding to the size and intensity of each of the white and black lines, the microprocessor (12) [processing a signal from the reading system, recognizing the feature of the boundary mark (M), and controlling] configured (i) to recognize the boundary marks (M) based on a detection of the boundary mark by both the first and second optical sensors and a comparison between the stored intensity and a detected intensity of each of the white and black lines, and (ii) to control the second and third motors (9, 5) based on recognition of the boundary marks (M) [,

wherein the device is able to perform the cutting in two mutually orthogonal directions upon rotation of the substrate (1) through 90° without guides for edge registration of the substrate].

Proposed New Claims

9 (New) The device according to claim 1, wherein the microprocessor (12) is further configured to recognize the boundary marks (M) based on a comparison between the stored size of each of the white and black lines and a detected size of each of the white and black lines.

10 (New) The device according to claim 9, wherein the microprocessor (12) is further configured to recognize the boundary marks (M) based on a comparison of a sum of the stored size of each of the white and black lines and a sum of the detected size of each of the white and black lines.

11 (New) The device according to claim 10, wherein the microprocessor (12) is further configured to recognize the boundary marks (M) based on a

determination that an angular correction for a second alignment and cutting with respect to a first alignment and cutting is less than a greatest drift which can be caused by the at least a pair of rollers (2) during a feed of the substrate.

12. (NEW) A method for the operation of ~~a~~ automatic device for trimming and cutting at right angles paper and other graphic and photographic substrates, the device comprising a microprocessor, a first optical sensor and a second optical sensor spaced from the first optical sensor, a cutter, and a pair of rollers which can cause a greatest drift of the substrate during feeding of the substrate, the substrate having a series of images printed thereon and marked by boundary marks comprising a preset sequence of white and black lines extending along an edge of each of said images oriented at right angles to a feed direction of the substrate, each of the white and black lines having a size and an intensity, the method comprising the steps of:

storing in the microprocessor a stored intensity and a stored size respectively corresponding to the size and intensity of each of the white and black lines comprising the boundary marks;

feeding the substrate into the automatic device;

detecting one of the boundary marks with the first optical sensor and with the second optical sensor;

recognizing one of the boundary marks based on a plurality of security levels comprising:

(i) a detection of the boundary mark by both the first and second optical sensors;

(ii) a comparison between the stored intensity of each of the white and black lines and a detected intensity of each of the white and black lines;

(iii) a comparison between the stored size of each of the white and black lines and a detected size of each of the white and black lines;

(iv) a comparison between a sum of the stored size of each of the white and black lines and a sum of the detected size of each of the white and black lines;

aligning in a first alignment position the cutter with the boundary mark recognized in accordance with the recognizing step;

cutting for a first time the substrate with the cutter in the first alignment position;

feeding the substrate further into the automatic device;

detecting another of the boundary marks with the first optical sensor and with the second optical sensor;

repeating the recognizing step for the another boundary mark;

aligning in a second alignment position the cutter position with the another boundary mark recognized in accordance with the recognizing step;

determining an angular correction for the second alignment position with respect to the first alignment position; and

cutting for a second time the substrate with the cutter in the second alignment position if the angular correction is less than the greatest drift of the substrate.

DISCUSSION POINTS

Disclosure of Roy *et al* (U.S. Patent No. 5, 586,479)

- Leading Edge of Image Detected Based on Discontinuity in Reflected Light (Col. 4, ln 62-67)
- Discontinuity In Reflected Light Due To:
  - Pigmented Toner At Leading Edge Of Image (Col. 4, ln 63-64)
  - Small Dark Mark Just Ahead Of Leading Edge of Image (Col. 5, ln 4-5)
  - Clear Tone At Leading Edge (If Pigmented Toner Abscent) (COl. 5, ln 12-13)

Not Disclosed In Roy *et al*

- Microprocessor having stored therein a preset sequence of white and black lines

Examiner's Official Notice

- Marking a work piece with a preset sequence of white and black lines providing automatic triggering of various operations during a processing of a work piece is old and well known in the art.

Examiner's Obviousness Argument

- Providing markings on a work piece and programming the microprocessor of Roy *et al* to read such markings is obvious

Excerpt Fr m 09/298,726 Specification (Page 5, ln 9-25)

. . . the recognition of the mark and the consent to the cutting are linked to as much as six different security levels, namely:

- the cutting mark consists of a precise white/black sequence stored in the microprocessor, which can recognize through scanning any type of mark with said features without any limit in size;

- during the scan, the device microprocessor stores the level of intensity of the white and black lines in order to create thresholds of acceptance and recognition;

- each line is also measured in thickness with a precision of 0.05 mm and is then compared with the corresponding stored size;

- the sum of the lines must correspond to the stored sum so as to prevent the tolerances, by adding up together, from causing errors;

- the mark M must be detected by both sensors in order to give the consent to the cutting;

- after the first alignment and cutting, the angular correction must be within an angle equivalent to the greatest drift which can be caused by the rollers 2 during the paper feed.

New Limitations Recited in Proposed Amendments to Claim 1

- each of the white and black lines having a size and an intensity.
- the microprocessor having stored therein a stored intensity and a stored size respectively corresponding to the size and intensity of each of the white and black lines.
- the microprocessor (12) configured
  - (i) to recognize the boundary marks (M) based on a detection of the boundary mark by both the first and second optical sensors and a comparison between the stored intensity and a detected intensity of each of the white and black lines, and
  - (ii) to control the second and third motors (9, 5) based on recognition of the boundary marks (M)

Respectfully submitted,

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DRAFT
for discussion purposes only

_____ By:_____
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